General

Guideline Title

Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: application to healthy patients undergoing elective procedures: an updated report by the American Society of Anesthesiologists Task Force on Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration.

Bibliographic Source(s)

Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: application to healthy patients undergoing elective procedures: an updated report by the American Society of Anesthesiologists Task Force on Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration. Anesthesiology. 2017 Mar;126(3):376-93. [107 references] PubMed

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: American Society of Anesthesiologists Committee on Standards and Practice Parameters. Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: application to healthy patients undergoing elective procedures: an updated report [trunc]. Anesthesiology. 2011 Mar;114(3):495-511. [71 references].

This guideline meets NGC's 2013 (revised) inclusion criteria.

NEATS Assessment

National Guideline Clearinghouse (NGC) has assessed this guideline's adherence to standards of trustworthiness, derived from the Institute of Medicine's report Clinical Practice Guidelines We Can Trust.

= Poor = Fair = Good = Very Good = Excellent

Assessment	Standard of Trustworthiness
YES	Disclosure of Guideline Funding Source

▮▮▮▯▯	Disclosure and Management of Financial Conflict of Interests
	Guideline Development Group Composition
UNKNOWN	Multidisciplinary Group
YES	Methodologist Involvement
▮▯▯▯▯	Patient and Public Perspectives
	Use of a Systematic Review of Evidence
▮▮▮▯▯	Search Strategy
▮▮▮▮▯	Study Selection
▮▮▮▮▮	Synthesis of Evidence
	Evidence Foundations for and Rating Strength of Recommendations
▮▮▮▮▮	Grading the Quality or Strength of Evidence
▮▮▮▮▮	Benefits and Harms of Recommendations
▮▮▮▮▮	Evidence Summary Supporting Recommendations
▮▯▯▯▯	Rating the Strength of Recommendations
▮▮▮▮▯	Specific and Unambiguous Articulation of Recommendations
▮▮▯▯▯	External Review
▮▮▮▯▯	Updating

Recommendations

Major Recommendations

Recommendations for Preoperative Assessment

Perform a review of pertinent medical records, a physical examination, and patient survey or interview as part of the preoperative evaluation.

The history, examination, and interview should include assessment of American Society of Anesthesiologists (ASA) physical status, age, sex, type of surgery, and potential for difficult airway management as well as consideration of gastroesophageal reflux disease,* dysphagia symptoms, other gastrointestinal motility and metabolic disorders (e.g., diabetes mellitus) that may increase the risk of regurgitation and pulmonary aspiration.

Inform patients of fasting requirements and the reasons for them sufficiently in advance of their procedures.

Verify patient compliance with fasting requirements at the time of their procedure.

When these fasting guidelines are not followed, compare the risks and benefits of proceeding, with

consideration given to the amount and type of liquids or solids ingested.

*The term "gastroesophageal reflux disease" refers to positional reflux and its consequent symptomology, rather than food intolerances (e.g., "tomatoes do not agree with me").

Recommendations for Clear Liquids

Clear liquids† may be ingested for up to 2 hours (h) before procedures requiring general anesthesia, regional anesthesia, or procedural sedation and analgesia.

These liquids should not include alcohol.

†Examples of clear liquids include, but are not limited to, water, and fruit juices without pulp, carbonated beverages, carbohydrate-rich nutritional drinks, clear tea, and black coffee.

Recommendations for Breast Milk

Breast milk may be ingested for up to 4 h before elective procedures requiring general anesthesia, regional anesthesia, or procedural sedation and analgesia.

Recommendations for Infant Formula

Infant formula may be ingested for up to 6 h before elective procedures requiring general anesthesia, regional anesthesia, or procedural sedation and analgesia.

Recommendations for Solids and Nonhuman Milk

A light meal or nonhuman milk may be ingested for up to 6 h before elective procedures requiring general anesthesia, regional anesthesia, or procedural sedation and analgesia.‡

Additional fasting time (e.g., 8 or more hours) may be needed in cases of patient intake of fried foods, fatty foods, or meat.

Consider both the amount and type of foods ingested when determining an appropriate fasting period.

Since nonhuman milk is similar to solids in gastric emptying time, consider the amount ingested when determining an appropriate fasting period.

‡The Task Force notes that intake of fried or fatty foods or meat may prolong gastric emptying time.

Recommendations for Gastrointestinal Stimulants

Gastrointestinal stimulants may be preoperatively administered to patients at increased risk of pulmonary aspiration.

Do not routinely administer preoperative gastrointestinal stimulants for the purpose of reducing the risk of pulmonary aspiration in patients with no apparent increased risk for pulmonary aspiration.

Recommendations for Pharmacologic Blockade of Gastric Acid Secretion

Medications that block gastric acid secretion may be preoperatively administered to patients at increased risk of pulmonary aspiration.

Do not routinely administer preoperative medications that block gastric acid secretion for the purpose of reducing the risk of pulmonary aspiration in patients with no apparent increased risk for pulmonary aspiration.

Recommendations for Antacids

Antacids may be preoperatively administered to patients at increased risk of pulmonary aspiration.

Only administer nonparticulate antacids.

Do not routinely administer preoperative antacids for the purpose of reducing the risk of pulmonary aspiration in patients with no apparent increased risk for pulmonary aspiration.

Recommendations for Antiemetics§

Antiemetics may be preoperatively administered to patients at increased risk of postoperative nausea and vomiting.
The routine preoperative administration of antiemetics to reduce the risk of nausea and vomiting is not recommended for patients with no apparent increased risk for pulmonary aspiration.

§These guidelines do not address the use of antiemetics during the extended postoperative period after upper airway protective reflexes are no longer impaired.

Recommendations for Anticholinergics

The administration of preoperative anticholinergics to reduce the risk of pulmonary aspiration is not recommended.

Recommendations for Multiple Agents

The routine administration of preoperative multiple agents is not recommended for patients with no apparent increased risk for pulmonary aspiration.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Pulmonary aspiration

Guideline Category

Evaluation

Prevention

Clinical Specialty

Anesthesiology

Nursing

Pulmonary Medicine

Surgery

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Health Care Providers

Nurses

Physicians

Guideline Objective(s)

- To provide direction for clinical practice related to preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration
- To reduce the severity of complications related to perioperative pulmonary aspiration

Target Population

Healthy patients of all ages undergoing elective procedures

Note: The guidelines do not apply to patients who undergo procedures with no anesthesia or only local anesthesia when upper airway protective reflexes are not impaired and when no risk factors for pulmonary aspiration are apparent. The guidelines may not apply to or may need to be modified for patients with coexisting diseases or conditions that can affect gastric emptying or fluid volume (e.g., pregnancy, obesity, diabetes, hiatal hernia, gastroesophageal reflux disease, ileus or bowel obstruction, emergency care, or enteral tube feeding) and patients in whom airway management might be difficult.

Interventions and Practices Considered

1. Preoperative assessment (e.g., history, physical examination, survey/interview, inform patient of fasting requirements)
2. Preoperative fasting periods for solids and liquids (clear liquids, breast milk, infant formula, solids and nonhuman milk)
3. Preoperative pharmacologic interventions:
    - Gastrointestinal stimulants (e.g., metoclopramide, cisapride)
    - Gastric acid secretion blockers (e.g., histamine-$_2$ receptor antagonists, cimetidine, ranitidine, famotidine)
    - Antacids (sodium citrate, sodium bicarbonate, or magnesium trisilicate)
    - Antiemetics (ondansetron)
    - Anticholinergics (atropine, glycopyrrolate)
    - Multiple pharmacologic agents

Note: The following interventions were considered but not recommended: routine preoperative administration of antiemetics or routine administration of preoperative multiple agents for patients with no apparent increased risk for pulmonary aspiration; administration of preoperative anticholinergics.

Major Outcomes Considered

- Pulmonary aspiration
- Frequency or severity of adverse consequences associated with aspiration (e.g., pneumonitis)
- Gastric contents (e.g., volume or pH)
- Nausea and vomiting

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Availability of Evidence

Preparation of these guidelines followed a rigorous methodological process. Evidence was obtained from two principal sources: scientific evidence and opinion-based evidence (see appendix 2 in the original guideline document for detailed methods and analyses).

Scientific evidence used in the development of these updated guidelines is based on cumulative findings from literature published in peer-reviewed journals. Literature citations are obtained from healthcare databases, direct internet searches, Task Force members, liaisons with other organizations, and from manual searches of references located in reviewed articles.

State of the Literature

For the systematic review, potentially relevant clinical studies were identified via electronic and manual searches of the literature. Healthcare database searches included PubMed, Web of Science, Google Books, and the Cochrane Central Register of Controlled Trials. The updated searches covered a 6.5-year period from January 1, 2010, through May 31, 2016. Search terms consisted of the interventions indicated in Appendix 2 of the original guideline document guided by the appropriate inclusion/exclusion criteria as stated in the "Focus" section in the original guideline document. Only studies containing original findings from peer-reviewed journals were acceptable. Editorials, letters, and other articles without data were excluded. Two hundred ninety-eight new citations were identified and reviewed, with 42 new studies meeting the above stated criteria. These studies were combined with 133 pre-2010 articles used in the previous update. A complete bibliography of articles used to develop these updated guidelines, organized by section, is available as Supplemental Digital Content 2 (see the "Availability of Companion Documents" field).

Number of Source Documents

175 articles were found acceptable as evidence for these guidelines.

Methods Used to Assess the Quality and Strength of the Evidence

Expert Consensus

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Scientific Evidence

Findings from the aggregated literature are reported in the text of the guidelines by evidence category, level, and direction and in Appendix 2 (Table 2) in the original guideline document. Evidence categories refer specifically to the strength and quality of the research design of the studies. Category A evidence represents results obtained from randomized controlled trials (RCTs) and Category B evidence represents observational results obtained from nonrandomized study designs or RCTs without pertinent comparison groups. When available, Category A evidence is given precedence over Category B evidence for any particular outcome. These evidence categories are further divided into evidence levels. Evidence levels refer specifically to the strength and quality of the summarized study findings (i.e., statistical findings, type of data, and the number of studies reporting/replicating the findings). In the document, only the highest level of evidence is included in the summary report for each intervention-outcome pair, including a directional designation of benefit, harm, or equivocality.

Category A

RCTs report comparative findings between clinical interventions for specified outcomes. Statistically

significant ($P < 0.01$) outcomes are designated as either beneficial (B) or harmful (H) for the patient; statistically nonsignificant findings are designated as equivocal (E).

Level 1: The literature contains a sufficient number of RCTs to conduct meta-analysis,§ and meta-analytic findings from these aggregated studies are reported as evidence.

Level 2: The literature contains multiple RCTs, but the number of RCTs is not sufficient to conduct a viable meta-analysis. Findings from these RCTs are reported separately as evidence.

Level 3: The literature contains a single RCT and findings are reported as evidence.

Category B

Observational studies or RCTs without pertinent comparison groups may permit *inference* of beneficial or harmful relationships among clinical interventions and clinical outcomes. Inferred findings are given a directional designation of beneficial (B), harmful (H), or equivocal (E). For studies that report statistical findings, the threshold for significance is $P < 0.01$.

Level 1: The literature contains observational comparisons (e.g., cohort, case-control research designs) with comparative statistics between clinical interventions for a specified clinical outcome.

Level 2: The literature contains noncomparative observational studies with associative statistics (e.g., relative risk, correlation, sensitivity/specificity).

Level 3: The literature contains noncomparative observational studies with descriptive statistics (e.g., frequencies, percentages).

Level 4: The literature contains case reports.

Insufficient Literature

The lack of sufficient scientific evidence in the literature may occur when the evidence is either unavailable (i.e., no pertinent studies found) or inadequate. Inadequate literature cannot be used to assess relationships among clinical interventions and outcomes because a clear interpretation of findings is not obtained due to methodological concerns (e.g., confounding of study design or implementation) or the study does not meet the inclusion criteria for content as defined in the "Focus" of the guideline.

Opinion-based Evidence

All opinion-based evidence (e.g., survey data, open-forum testimony, Internet-based comments, letters, and editorials) relevant to each topic was considered in the development of these updated guidelines. However, only the findings obtained from formal surveys are reported in the current update.

Opinion surveys were developed to address each clinical intervention identified in the document. Identical surveys were distributed to expert consultants and a random sample of American Society of Anesthesiologists (ASA) members.

Category A: Expert Opinion

Survey responses from Task Force–appointed expert consultants are reported in summary form in the text, with a complete listing of consultant survey responses reported in appendix 2 (table 3) in the original guideline document.

Category B: Membership Opinion

Survey responses from a random sample of active members of the ASA are reported in summary form in the text, with a complete listing of responses reported in appendix 2 (table 4) in the original guideline document.

Survey responses from expert and membership sources are recorded using a 5-point scale and summarized based on median values.**

Strongly Agree: Median score of 5 (at least 50% of the responses are 5)

Agree: Median score of 4 (at least 50% of the responses are 4 or 4 and 5)

Equivocal: Median score of 3 (at least 50% of the responses are 3, or no other response category or combination of similar categories contain at least 50% of the responses)

Disagree: Median score of 2 (at least 50% of responses are 2 or 1 and 2)

Strongly Disagree: Median score of 1 (at least 50% of responses are 1)

Category C: Informal Opinion

Open-forum testimony obtained during development of the these guidelines, Internet-based comments, letters, and editorials are all informally evaluated and discussed during the formulation of guideline recommendations. When warranted, the Task Force may add educational information or cautionary notes based on this information.

§All meta-analyses are conducted by the ASA methodology group. Meta-analyses from other sources are reviewed but not included as evidence in this document.

**When an equal number of categorically distinct responses are obtained, the median value is determined by calculating the arithmetic mean of the two middle values. Ties are calculated by a predetermined formula.

Methods Used to Analyze the Evidence

Meta-Analysis

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Results for each pertinent outcome are summarized and, when sufficient numbers of randomized controlled trials (RCTs) are found, formal meta-analyses are conducted. The literature relating to seven evidence linkages contained enough studies with well-defined experimental designs and statistical information to conduct formal meta-analyses. These seven evidence linkages are: (1) preoperative fasting of liquids between 2 and 4 hours for adults, (2) preoperative fasting of liquids between 2 and 4 hours for children, (3) preoperative metoclopramide, (4) preoperative ranitidine (orally administered), (5) preoperative cimetidine (orally administered), (6) preoperative omeprazole (orally administered), and (7) perioperative ondansetron (intravenously administered). Outcomes assessed were limited to gastric volume, gastric acidity, nausea, and vomiting (see Table 2 in the original guideline document).

General variance-based effect-size estimates or combined probability tests were obtained for continuous outcome measures, and Mantel-Haenszel odds ratios were obtained for dichotomous outcome measures. Two combined probability tests were employed as follows: (1) the Fisher combined test, producing chi-square values based on logarithmic transformations of the reported *P* values from the independent studies, and (2) the Stouffer combined test, providing weighted representation of the studies by weighting each of the standard normal deviates by the size of the sample. An odds ratio procedure based on the Mantel-Haenszel method for combining study results using 2 x 2 tables was used with outcome frequency data. An acceptable significance level was set at $P < 0.01$ (one-tailed). Tests for heterogeneity of the independent studies were conducted to assure consistency among the study results. When significant heterogeneity was found among the studies ($P < 0.01$), DerSimonian-Laird random-effects odds ratios were obtained. To evaluate potential publishing bias, a "fail-safe n" value was calculated. No search for unpublished studies was conducted, and no reliability tests for locating research results were done. For findings to be accepted as significant, odds ratios must agree with combined test results whenever both types of data were assessed. In addition, findings from both the Fisher and weighted Stouffer combined tests must agree with each other.

Consensus-based Evidence

For the previous update, consensus was obtained from multiple sources, including: (1) survey opinion from consultants who were selected based on their knowledge or expertise in preoperative fasting and prevention of pulmonary aspiration, (2) survey opinions solicited from active members of the American Society of Anesthesiologists (ASA) membership, (3) testimony from attendees of a publicly-held open forum for the original guidelines held at a national anesthesia meeting, (4) Internet commentary, and (5) Task Force opinion and interpretation. The survey rate of return is 59.7% (n = 37 of 62) for the consultants (Table 3), and 471 responses were received from active ASA members (see Table 4 in the original guideline document).

For the previous update, an additional survey was sent to the consultants asking them to indicate which, if any, of the evidence linkages would change their clinical practices if the guidelines were instituted. The percent of consultants expecting no change associated with each linkage were as follows: preoperative assessment 95%; preoperative fasting of solids 75%; preoperative fasting of liquids 67%; preoperative fasting of breast milk 78%; gastrointestinal stimulants 95%; pharmacologic blockage of gastric secretion 91%; antacids 100%; antiemetics 98%; anticholinergics 100%; and multiple agents 98%. Ninety-six percent of the respondents indicated that the guidelines would have no effect on the amount of time spent on a typical case.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Task Force Members and Consultants

In 2015, the American Society of Anesthesiology (ASA) Committee on Standards and Practice Parameters requested that the updated guidelines published in 2011 be re-evaluated. This current update consists of a literature evaluation and an update of the evidence-based guideline nomenclature. A summary of recommendations is found in Appendix 1 (Table 1) in the original guideline document.

The previous update was developed by an ASA-appointed Task Force of ten members, including anesthesiologists in both private and academic practice from various geographic areas of the United States and consulting methodologists from the ASA Committee on Standards and Practice Parameters.

The original guidelines and the previous update in 2011 was developed by means of a seven-step process. First, the Task Force reached consensus on the criteria for evidence. Second, original published research studies from peer-reviewed journals relevant to preoperative fasting and pulmonary aspiration were reviewed and evaluated. Third, expert consultants were asked to: (1) participate in opinion surveys on the effectiveness of various preoperative fasting strategies and pharmacologic agents and (2) review and comment on a draft of the guidelines developed by the Task Force. Fourth, opinions about the guideline recommendations were solicited from a random sample of active members of the ASA. Fifth, the Task Force held an open forum at a major national meeting[‡] to solicit input on its draft recommendations. Sixth, the consultants were surveyed to assess their opinions on the feasibility of implementing the updated guidelines. Seventh, all available information was used to build consensus within the Task Force to finalize the updated guidelines.

‡Society for Ambulatory Anesthesia 12th Annual Meeting, Orlando, Florida, 1997.

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

These guidelines were submitted for publication October 26, 2016; accepted for publication October 26, 2016; and approved by the ASA House of Delegates on October 26, 2016.

‡Society for Ambulatory Anesthesia 12th Annual Meeting, Orlando, Florida, 1997.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

Evidence was obtained from two principal sources: scientific evidence and opinion-based evidence.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate enhancements in the quality and efficiency of anesthesia care, including:

- Prevention or reduction of perioperative pulmonary aspiration
- Reduction of complications associated with pulmonary aspiration
  - Pneumonia
  - Respiratory disabilities
  - Perioperative morbidity
- Decreased risk of dehydration or hypoglycemia from prolonged fasting
- Increased patient satisfaction
- Avoidance of delays and cancellations

Refer to the "Literature Findings" sections in the original guideline document for potential benefits of specific interventions.

Potential Harms

Prolonged fasting is associated with risk of dehydration and hypoglycemia.

Refer to the "Literature Findings" sections in the original guideline document for potential harms of specific interventions.

Qualifying Statements

Qualifying Statements

- Practice guidelines are systematically developed recommendations that assist the practitioner and patient in making decisions about health care. These recommendations may be adopted, modified, or rejected according to clinical needs and constraints, and are not intended to replace local institutional policies. In addition, practice guidelines developed by the American Society of Anesthesiologists (ASA) are not intended as standards or absolute requirements, and their use cannot guarantee any specific outcome. Practice guidelines are subject to revision as warranted by the evolution of medical knowledge, technology, and practice. They provide basic recommendations that are supported by a synthesis and analysis of the current literature, expert and practitioner opinion, open forum commentary, and clinical feasibility data.
- Airway management techniques that are intended to reduce the occurrence of pulmonary aspiration are not the focus of these guidelines. The guidelines do not address the selection of anesthetic technique, nor do they address enhanced recovery protocols not designed to reduce the perioperative risk of pulmonary aspiration.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Effectiveness

Safety

Identifying Information and Availability

Bibliographic Source(s)

Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: application to healthy patients undergoing elective procedures: an updated report by the American Society of Anesthesiologists Task Force on Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration. Anesthesiology. 2017 Mar;126(3):376-93. [107 references] PubMed

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2017 Mar

Guideline Developer(s)

American Society of Anesthesiologists - Medical Specialty Society

Source(s) of Funding

Support was provided solely from institutional and/or departmental sources.

Guideline Committee

American Society of Anesthesiologists Committee on Standards and Practice Parameters

Composition of Group That Authored the Guideline

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Financial Disclosures/Conflicts of Interest

The authors declare no competing interests.

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This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the Anesthesiology Journal Web site .

Availability of Companion Documents

The following are available:

- Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: application to healthy patients undergoing elective procedures: an updated

report. Supplemental digital content 1: bibliography in alphabetical order. Schaumburg (IL): American Society of Anesthesiologists; 2017. 11 p. Available from the Anesthesiology Journal Web site .

Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: application to healthy patients undergoing elective procedures: an updated report. Supplemental digital content 2: bibliography by section. Schaumburg (IL): American Society of Anesthesiologists; 2017. 17 p. Available from the Anesthesiology Journal Web site .

Patient Resources

None available

NGC Status

This summary was completed by ECRI on May 31, 1999. The information was verified by the guideline developer on July 14, 1999. This NGC summary was updated by ECRI Institute on December 13, 2011. This NGC summary was updated by ECRI Institute on January 3, 2018. The guideline developer agreed to not review the content.

This NEATS assessment was completed by ECRI Institute on November 28, 2017. The information was verified by the guideline developer on December 8, 2017.

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